

**PROPOSAL FOR THE EXPERIMENTAL
INVESTIGATION OF THE (γ, n) REACTION IN THE GIANT DIPOLE
RESONANCE REGION ON THE HIGH-SPIN TARGET $^{178m_2}\text{Hf}(\Gamma^\pi = 16^+)$**

INTRODUCTION AND SCIENTIFIC MOTIVATION

CEBAF AND STATEMENT OF THE PROBLEM. The creation of a new high intensive continuous Electron Beam Accelerator Facility (CEBAF) in Newport News (Virginia state, USA) with electron energies of 0.045-0.40 GeV with intensities of up to 200 μA and energy spread of $5 \cdot 10^{-5}$ opens unique possibilities in the fields of modern nuclear physics and elementary particles. Vibrational modes are a feature of almost all Fermi systems. In nuclei collective vibrations have been known to exist since the discovery of the giant dipole resonance (GDR) in 1947. Many other giant vibrational modes have since been identified, and their gross properties mapped as a function of nuclear species. The study of these modes has generated important information about the bulk behavior of nuclei near equilibrium and, through microscopic efforts at understanding them, provided precise information about the global features of the effective interaction among nucleons. The GDR is one of the most beautiful examples of collective nuclear motion available to us. It has been observed in all composite nuclei, and is found to fully exhaust the appropriate energy weighted sum rule (EWSR) in all nuclei of mass > 40 . However, nothing is known about the excitation of the giant dipole resonance from a high spin isomeric state. Information about the GDR for the high spin four-quasiparticle $^{178m_2}\text{Hf}$ isomer $T_{1/2} \approx 31$ yr., $\Gamma^\pi = 16^+$ can give considerable information about the behavior of nuclei at high spin and high excitation.

CROSS-SECTION AND EXCITATION FUNCTION. Cross-section measurements and excitation functions of the reaction $^{178m_2}\text{Hf}(\gamma, n)$ in the γ -quanta energy region available from the